



## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION 7

11201 Renner Boulevard  
Lenexa, Kansas 66219

### **MEMORANDUM**

**SUBJECT:** Removal Site Evaluation Report  
Martha Rose Chemical Site  
Holden, Missouri

**FROM:** Ann Jacobs, Human Health Risk Assessor  
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**TO:** Manuel Schmaedick, On-Scene Coordinator  
Assessment Emergency Response and Removal Branch  
Superfund and Emergency Management Division

As requested, the Applied Sciences Branch hydrogeologist, human health and ecological risk assessors have reviewed and provided comments on the Removal Site Evaluation (RSE) for the Martha Rose Chemical Site in Holden, Missouri. If you have any further questions, please contact Randy Brown at x7978, Ann Jacobs at x7930, or Venessa Madden at x7794.

### **Human Health Risk Assessor Comments**

Site assessment work was completed between March and November 2020. The first event, between March 4-6 and 12-13, 2020, included installation of seven sub-slab vapor ports at seven properties, and vapor intrusion (VI) sampling (indoor air, crawlspace, and/or sub-slab vapor) at five commercial buildings and three residential buildings. The second event, during May 18-20, 2020, involved collection of 25 exterior soil gas samples. The third event, during June 29 to July 2, 2020, involved additional VI sampling at seven properties previously sampled in the March 2020 event, and installation of five sub-slab vapor ports with VI sampling at two commercial buildings and five private residences. The fourth event, during August 4-6, 2020, involved advancement of 26 borings via direct push technology (DPT). A total of 42 soil samples, 10 groundwater samples, and three exterior soil gas samples were collected. A follow-up trip occurred during August 12 and 13 to collect one indoor air sample at a private residence that had not been sampled during previous events. The fifth event, during November 9-20, 2020, involved DPT soil and groundwater sampling, VI sampling, and surface water



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and sediment sampling from the unnamed tributary that runs through the southwest site boundary. A total of 38 soil samples and 10 groundwater samples were collected from 19 of the 20 borings advanced via DPT.

Vapor intrusion data for indoor air and sub-slab soil gas were compared to Region 7's Vapor Intrusion Removal Management Levels which are based on noncancer health effects hazard quotient of 1.0 and an excess cancer risk of  $1 \times 10^{-4}$ . One indoor air result at 503 W. Kissock Street had an indoor air concentration of trichloroethene (TCE) that was  $2.0 \mu\text{g}/\text{m}^3$ , which is equal to the removal management level (RML) of  $2.0 \mu\text{g}/\text{m}^3$ ; however, the concurrent sub-slab soil gas concentration of  $0.33 \mu\text{g}/\text{m}^3$  was well below the sub-slab soil gas RML of  $67 \mu\text{g}/\text{m}^3$ . Given that the sub-slab soil gas concentration was lower than the indoor air concentration, an indoor air source of TCE unrelated to the site may be responsible for the indoor air concentration. A follow-up round of sampling may be necessary at this location for further assessment. No other indoor air or sub-slab soil gas samples collected at any of the other collection events exceeded a level of health concern.

The direct push soil samples were collected at depths greater than typical direct contact human exposure. The shallowest bores were 3-4 feet below ground surface (bgs) and as deep as 14-15 feet bgs. These data may be useful for site characterization, but precluded comparison to likely direct contact scenarios encountered at the site. The composite worker scenario was used for comparison even though it is unlikely a worker would contact soil at these depths. TCE was detected at  $2,100 \text{ mg/kg}$  at one boring location (B-20), at depths of 13-15 feet, which exceeds the composite worker RML of  $18.7 \text{ mg/kg}$ . While a concentration at this depth may not present a direct contact threat to workers, it does represent a potential source of contamination that may impact groundwater. The B-20 boring soil sample had detections of all the other volatile organic compounds (VOCs), but concentrations did not exceed the composite worker RML for those contaminants. The soil borings at the other locations did not indicate widespread contamination.

Groundwater contamination appears to be limited to 4 locations exceeding the TCE maximum contaminant level (MCL) of  $5 \mu\text{g}/\text{L}$  MCL with the highest detected concentration of  $24 \mu\text{g}/\text{L}$  at B-27/TW-27. Vinyl chloride was detected above the MCL of  $2 \mu\text{g}/\text{L}$  at location B-41/TW-41 at  $32 \mu\text{g}/\text{L}$ . There are known public or domestic drinking water wells at or near the site. All other locations were below their respective MCLs or reporting limits.

During the November 2020 sampling event, surface water samples were collected from West Pin Oak Creek and an unnamed tributary that ran adjacent to the Martha Rose Site. Six VOCs were detected in all seven surface water samples collected (at SW-101 to SW-107). TCE was detected at three of the surface water sample locations at concentrations ranging from  $0.29 \mu\text{g}/\text{L}$  to  $0.57 \mu\text{g}/\text{L}$ . 1,1-Dichloroethane was detected in two surface water samples, vinyl chloride in four samples, *cis*-1,2-dichloroethylene and acetone in six samples, and *trans*-1,2-dichloroethylene in one sample. No analyte concentration exceeded the MCL in any sample. No other VOCs or polychlorinated biphenyls (PCBs) were detected at levels above laboratory reporting limits in the surface water samples collected. Surface water detections do not indicate significant risks to human receptors based on this limited number of samples.

## **Ecological Risk Assessor Comments**

### **General Comment**

1. Sediment and surface water results were screened in the RSE for the primary Contaminants of Potential Concern (COPCs) at the site. We completed a similar comparison to the USEPA

Region 4 Ecological Screening Values (ESVs) (Tables 1 and 2) (USEPA, 2018), but for all of the VOCs and Aroclors sampled at the site, and found similar results as the RSE. The majority of the data was non-detect; however, detections of Aroclor 1260, 1,2-dichloroethene (total), *cis*-1,2-dichloroethene, acetone, and TCE exceeded ESVs in sediment. Non-detect concentrations (i.e., reporting limit) of Aroclors also exceeded ESVs in surface water.

Acetone in sediment is likely a laboratory contaminant, and the Aroclor 1260 concentrations were only slightly above the wildlife ESV, but below the aquatic ESV. However, elevated concentrations of 1,2-dichloroethene (total), *cis*-1,2-dichloroethene, and TCE at Location 104 indicate that these contaminants are COPCs that require additional evaluation.

The USEPA Region 4 risk assessment guidance (USEPA, 2018) also provides an additional screening level, called a Refinement Screening Value (RSV). These values are less conservative, and are based on Lowest-Observed-Adverse-Effect-Levels (LOAELs). They are useful for refining the list of COPCs. The RSVs for 1,2-dichloroethene (total), *cis*-1,2-dichloroethene, and TCE are 1,135 µg/kg, 1,135 µg/kg, and 692 µg/kg, respectively. Both 1,2-dichloroethene (total) and *cis*-1,2-dichloroethene exceed the RSV; therefore, these COPCs cannot be further screened out. Because the exceedances of 1,2-dichloroethene (total) and *cis*-1,2-dichloroethene are isolated to one location, we agree with the RSE recommendation of additional investigation of the creek in the vicinity of Location 104 to further characterize the potential extent of this contamination.

With regard to PCBs, we understand the creek has previously been remediated due to PCB contamination. The surface water concentrations for Aroclors were all non-detect; however, the reporting limits exceed the ESV/RSV. If the PCB source, as well as much of the contaminated sediment has been removed, Aroclors in surface water are not likely to be an ecological concern. Aroclor 1260, which was detected in sediment, is slightly above the wildlife ESV, but below the aquatic ESV and RSV of 676 µg/kg. Given the localized nature of the Aroclor 1260 exceedance in sediment, potential risk to wildlife would be very limited due to the large home range of the wildlife receptors that may be exposed.

Table 1. Sediment Screening Results.

| Contaminant (µg/kg)       | Location |       |       |       |       |       |       | ESV<br>(µg/kg) |
|---------------------------|----------|-------|-------|-------|-------|-------|-------|----------------|
|                           | 101      | 102   | 103   | 104   | 105   | 106   | 107   |                |
| PCB-1016 (Aroclor 1016)   | <3.7     | <3.6  | <3.1  | <3.5  | <3.7  | <3.7  | <3.8  | 14/59.8*       |
| PCB-1221 (Aroclor 1221)   | <10.5    | <10.4 | <8.9  | <10.0 | <10.5 | <10.6 | <10.9 | 14/59.8*       |
| PCB-1232 (Aroclor 1232)   | <4.8     | <4.8  | <4.1  | <4.6  | <4.8  | <4.8  | <5.0  | 14/59.8*       |
| PCB-1242 (Aroclor 1242)   | <10.6    | <10.5 | <9.0  | <10.1 | <10.6 | <10.7 | <11.0 | 14/59.8*       |
| PCB-1248 (Aroclor 1248)   | <2.9     | <2.9  | <2.5  | <2.8  | <2.9  | <2.9  | <3.0  | 14/59.8*       |
| PCB-1254 (Aroclor 1254)   | <4.1     | <4.1  | <3.5  | <3.9  | <4.1  | <4.2  | <4.3  | 14/59.8*       |
| PCB-1260 (Aroclor 1260)   | <5.5     | <5.4  | <4.6  | <5.2  | 17.3  | 11.7  | 7.5   | 14/59.8*       |
| 1,1,1,2-Tetrachloroethane | <1.3     | <1.3  | <0.96 | <1.2  | <1.2  | <1.2  | <1.4  | 99             |
| 1,1,1-Trichloroethane     | <0.97    | <0.93 | <0.70 | 3.3   | <0.85 | <0.88 | <1.0  | 70             |
| 1,1,2,2-Tetrachloroethane | <1.3     | <1.2  | <0.94 | <1.1  | <1.1  | <1.2  | <1.4  | 250            |
| 1,1,2-Trichloroethane     | <0.82    | <0.78 | <0.59 | <0.71 | <0.72 | <0.74 | <0.86 | 538            |
| 1,1-Dichloroethane        | <0.51    | <0.48 | <0.37 | 3.8   | <0.44 | <0.46 | <0.53 | 20             |
| 1,1-Dichloroethene        | <0.83    | <0.79 | <0.60 | 1.9   | <0.73 | <0.76 | <0.87 | 100            |

|                              |       |       |       |       |       |       |       |       |
|------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1,1-Dichloropropene          | <1.2  | <1.1  | <0.84 | <1.0  | <1.0  | <1.1  | <1.2  | N/A   |
| 1,2,3-Trichlorobenzene       | <1.0  | <0.99 | <0.75 | <0.90 | <0.91 | <0.94 | <1.1  | 113   |
| 1,2,3-Trichloropropane       | <2.8  | <2.7  | <2.0  | <2.4  | <2.4  | <2.5  | <2.9  | N/A   |
| 1,2,4-Trichlorobenzene       | <1.0  | <0.99 | <0.75 | <0.90 | <0.91 | <0.94 | <1.1  | 11    |
| 1,2,4-Trimethylbenzene       | <0.87 | <0.83 | <0.63 | <0.76 | <0.76 | <0.79 | <0.91 | 97    |
| 1,2-Dibromo-3-chloropropane  | <2.4  | <2.3  | <1.7  | <2.1  | <2.1  | <2.2  | <2.5  | N/A   |
| 1,2-Dibromoethane (EDB)      | <0.69 | <0.67 | <0.50 | <0.60 | <0.61 | <0.63 | <0.73 | N/A   |
| 1,2-Dichlorobenzene          | <0.81 | <0.78 | <0.59 | <0.71 | <0.71 | <0.74 | <0.85 | 95    |
| 1,2-Dichloroethane           | <0.52 | <0.50 | <0.38 | <0.45 | <0.46 | <0.47 | <0.54 | 986   |
| 1,2-Dichloroethylene (Total) | 1.8   | <1.4  | 5.0   | 2860  | 16.3  | <1.3  | 1.8   | 200   |
| 1,2-Dichloropropane          | <1.3  | <1.2  | <0.92 | <1.1  | <1.1  | <1.2  | <1.3  | 428   |
| 1,3,5-Trimethylbenzene       | <0.81 | <0.78 | <0.59 | <0.71 | <0.71 | <0.74 | <0.85 | 164   |
| 1,3-Dichlorobenzene          | <0.93 | <0.89 | <0.67 | <0.81 | <0.82 | <0.85 | <0.98 | 164   |
| 1,3-Dichloropropane          | <0.90 | <0.86 | <0.65 | <0.78 | <0.79 | <0.82 | <0.94 | N/A   |
| 1,4-Dichlorobenzene          | <1.1  | <1.0  | <0.76 | <0.92 | <0.92 | <0.96 | <1.1  | N/A   |
| 2,2-Dichloropropane          | <0.62 | <0.59 | <0.45 | <0.54 | <0.54 | <0.56 | <0.65 | N/A   |
| 2-Butanone (MEK)             | 9.9   | <4.2  | 5.5   | <3.9  | 8.1   | 8.2   | 10.3  | 7,604 |
| 2-Chlorotoluene              | <0.95 | <0.91 | <0.68 | <0.82 | <0.83 | <0.86 | <0.99 | N/A   |
| 2-Hexanone                   | <3.2  | <3.1  | <2.3  | <2.8  | <2.8  | <2.9  | <3.4  | 45    |
| 4-Chlorotoluene              | <0.78 | <0.75 | <0.56 | <0.68 | <0.68 | <0.71 | <0.82 | N/A   |
| 4-Methyl-2-pentanone (MIBK)  | <3.9  | <3.8  | <2.8  | <3.4  | <3.4  | <3.6  | <4.1  | 73    |
| Acetone                      | 109   | <20.1 | 34.6  | 19.2  | 105   | 86.8  | 110   | 65    |
| Benzene                      | 1.8   | <0.61 | 3.0   | <0.56 | 0.65  | 1.4   | 1.8   | 10    |
| Bromobenzene                 | <1.2  | <1.2  | <0.88 | <1.1  | <1.1  | <1.1  | <1.3  | N/A   |
| Bromochloromethane           | <0.78 | <0.75 | <0.56 | <0.68 | <0.68 | <0.71 | <0.82 | 198   |
| Bromodichloromethane         | <0.78 | <0.75 | <0.56 | <0.68 | <0.68 | <0.71 | <0.82 | N/A   |
| Bromoform                    | <0.75 | <0.71 | <0.54 | <0.65 | <0.65 | <0.68 | <0.78 | 142   |
| Bromomethane                 | <3.8  | <3.7  | <2.8  | <3.3  | <3.3  | <3.5  | <4.0  | 6.5   |
| Carbon disulfide             | <0.83 | <0.80 | <0.60 | <0.73 | <0.73 | <0.76 | <0.87 | 7.8   |
| Carbon tetrachloride         | <1.1  | <1.1  | <0.80 | <0.97 | <0.98 | <1.0  | <1.2  | 57    |
| Chlorobenzene                | <0.81 | <0.78 | <0.59 | <0.71 | <0.71 | <0.74 | <0.85 | N/A   |
| Chloroethane                 | <1.9  | <1.9  | <1.4  | <1.7  | <1.7  | <1.8  | <2.0  | N/A   |
| Chloroform                   | <0.64 | <0.61 | <0.46 | <0.56 | <0.56 | <0.58 | <0.67 | 87    |
| Chloromethane                | <1.0  | <0.99 | <0.75 | <0.90 | <0.91 | <0.94 | <1.1  | N/A   |
| Dibromochloromethane         | <0.84 | <0.80 | <0.61 | <0.73 | <0.74 | <0.76 | <0.88 | 198   |
| Dibromomethane               | <0.78 | <0.75 | <0.56 | <0.68 | <0.68 | <0.71 | <0.82 | N/A   |
| Dichlorodifluoromethane      | <1.5  | <1.5  | <1.1  | <1.3  | <1.3  | <1.4  | <1.6  | N/A   |
| Ethylbenzene                 | <0.60 | <0.57 | 0.89  | <0.52 | <0.53 | <0.55 | <0.63 | 290   |
| Hexachloro-1,3-butadiene     | <1.1  | <1.1  | <0.80 | <0.96 | <0.97 | <1.0  | <1.2  | N/A   |
| Isopropylbenzene (Cumene)    | <0.74 | <0.71 | <0.53 | <0.64 | <0.65 | <0.67 | <0.77 | 35    |
| Methyl-tert-butyl ether      | <0.62 | <0.60 | <0.45 | <0.54 | <0.55 | <0.57 | <0.65 | N/A   |
| Methylene Chloride           | <3.6  | <3.4  | <2.6  | <3.1  | <3.1  | <3.2  | <3.7  | 18    |

|                           |       |       |       |       |       |       |       |     |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-----|
| Naphthalene               | <1.1  | <1.0  | <0.77 | <0.93 | <0.93 | <0.97 | <1.1  | 176 |
| Styrene                   | <0.76 | <0.73 | <0.55 | <0.67 | <0.67 | <0.70 | <0.80 | 126 |
| Tetrachloroethene         | <0.54 | <0.51 | <0.39 | <0.47 | <0.47 | <0.49 | <0.56 | 2   |
| Toluene                   | 0.96  | <0.44 | 2.9   | <0.40 | 0.77  | 0.94  | 1.2   | 10  |
| Trichloroethene           | <0.94 | <0.90 | 1.9   | 141   | 3.9   | <0.86 | 1.8   | 78  |
| Trichlorofluoromethane    | <0.80 | <0.76 | <0.58 | <0.69 | <0.70 | <0.73 | <0.83 | N/A |
| Vinyl chloride            | <0.86 | <0.83 | <0.63 | 6.9   | <0.76 | <0.79 | <0.90 | 482 |
| Xylene (Total)            | <1.5  | <1.4  | <1.1  | <1.3  | <1.3  | <1.3  | <1.5  | 130 |
| cis-1,2-Dichloroethene    | 1.8   | <0.54 | 5.0   | 2520  | 16.3  | 0.57  | 1.8   | 432 |
| cis-1,3-Dichloropropene   | <0.69 | <0.66 | <0.50 | <0.60 | <0.60 | <0.63 | <0.72 | N/A |
| n-Butylbenzene            | <0.84 | <0.81 | <0.61 | <0.73 | <0.74 | <0.77 | <0.88 | N/A |
| n-Propylbenzene           | <1.0  | <1.0  | <0.75 | <0.91 | <0.91 | <0.95 | <1.1  | N/A |
| p-Isopropyltoluene        | <0.89 | <0.86 | <0.65 | <0.78 | <0.78 | <0.81 | <0.93 | N/A |
| sec-Butylbenzene          | <0.95 | <0.91 | <0.69 | <0.83 | <0.83 | <0.86 | <0.99 | N/A |
| tert-Butylbenzene         | <1.1  | <1.1  | <0.83 | <1.0  | <1.0  | <1.0  | <1.2  | N/A |
| trans-1,2-Dichloroethene  | <0.88 | <0.84 | <0.64 | 12.6  | <0.77 | <0.80 | <0.92 | 389 |
| trans-1,3-Dichloropropene | <0.59 | <0.57 | <0.43 | <0.52 | <0.52 | <0.54 | <0.62 | N/A |

\*Two ESVs are available for Total PCBs, including a wildlife value of 14 µg/kg and an aquatic value of 59.8 µg/kg. Concentrations highlighted in yellow exceed the ESV.

Table 2. Surface Water Screening Results.

| Contaminant (µg/L)          | Location |        |        |        |       |       |        | ESV            |
|-----------------------------|----------|--------|--------|--------|-------|-------|--------|----------------|
|                             | 101      | 102    | 103    | 104    | 105   | 106   | 107    |                |
| PCB-1016 (Aroclor 1016)     | <0.13    | <0.13  | <0.15  | <0.14  | <0.15 | <0.13 | <0.15  | 0.00012/0.014* |
| PCB-1221 (Aroclor 1221)     | <0.15    | <0.15  | <0.17  | <0.16  | <0.17 | <0.15 | <0.17  | 0.00012/0.014* |
| PCB-1232 (Aroclor 1232)     | <0.15    | <0.15  | <0.17  | <0.16  | <0.17 | <0.15 | <0.17  | 0.00012/0.014* |
| PCB-1242 (Aroclor 1242)     | <0.15    | <0.15  | <0.17  | <0.16  | <0.17 | <0.15 | <0.17  | 0.00012/0.014* |
| PCB-1248 (Aroclor 1248)     | <0.15    | <0.15  | <0.17  | <0.16  | <0.17 | <0.15 | <0.17  | 0.00012/0.014* |
| PCB-1254 (Aroclor 1254)     | <0.15    | <0.15  | <0.17  | <0.16  | <0.17 | <0.15 | <0.17  | 0.00012/0.014* |
| PCB-1260 (Aroclor 1260)     | <0.17    | <0.17  | <0.19  | <0.18  | <0.19 | <0.17 | <0.19  | 0.00012/0.014* |
| 1,1,1,2-Tetrachloroethane   | <0.21    | <0.21  | <0.21  | <0.21  | <0.21 | <0.21 | <0.21  | 360            |
| 1,1,1-Trichloroethane       | <0.13    | <0.13  | <0.13  | <0.13  | <0.13 | <0.13 | <0.13  | 496            |
| 1,1,2,2-Tetrachloroethane   | <0.28    | <0.28  | <0.28  | <0.28  | <0.28 | <0.28 | <0.28  | 1,784          |
| 1,1,2-Trichloroethane       | <0.28    | <0.28  | <0.28  | <0.28  | <0.28 | <0.28 | <0.28  | 2,097          |
| 1,1-Dichloroethane          | <0.098   | <0.098 | <0.098 | <0.098 | 0.11  | 0.13  | <0.098 | 2,692          |
| 1,1-Dichloroethene          | <0.21    | <0.21  | <0.21  | <0.21  | <0.21 | <0.21 | <0.21  | 1,217          |
| 1,1-Dichloropropene         | <0.18    | <0.18  | <0.18  | <0.18  | <0.18 | <0.18 | <0.18  | N/A            |
| 1,2,3-Trichlorobenzene      | <0.62    | <0.62  | <0.62  | <0.62  | <0.62 | <0.62 | <0.62  | 35             |
| 1,2,3-Trichloropropane      | <0.36    | <0.36  | <0.36  | <0.36  | <0.36 | <0.36 | <0.36  | N/A            |
| 1,2,4-Trichlorobenzene      | <0.37    | <0.37  | <0.37  | <0.37  | <0.37 | <0.37 | <0.37  | 35             |
| 1,2,4-Trimethylbenzene      | <0.26    | <0.26  | <0.26  | <0.26  | <0.26 | <0.26 | <0.26  | 56             |
| 1,2-Dibromo-3-chloropropane | <0.95    | <0.95  | <0.95  | <0.95  | <0.95 | <0.95 | <0.95  | N/A            |
| 1,2-Dibromoethane (EDB)     | <0.19    | <0.19  | <0.19  | <0.19  | <0.19 | <0.19 | <0.19  | N/A            |
| 1,2-Dichlorobenzene         | <0.24    | <0.24  | <0.24  | <0.24  | <0.24 | <0.24 | <0.24  | 115            |

|                             |        |        |        |        |        |        |        |        |
|-----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1,2-Dichloroethane          | <0.23  | <0.23  | <0.23  | <0.23  | <0.23  | <0.23  | <0.23  | 2,294  |
| 1,2-Dichloroethene (Total)  | 0.63   | <0.26  | <0.26  | 13.3   | 7.4    | 7.6    | 5.8    | 1,629  |
| 1,2-Dichloropropane         | <0.16  | <0.16  | <0.16  | <0.16  | <0.16  | <0.16  | <0.16  | 1,064  |
| 1,3,5-Trimethylbenzene      | <0.21  | <0.21  | <0.21  | <0.21  | <0.21  | <0.21  | <0.21  | 56     |
| 1,3-Dichlorobenzene         | <0.24  | <0.24  | <0.24  | <0.24  | <0.24  | <0.24  | <0.24  | 115    |
| 1,3-Dichloropropane         | <0.22  | <0.22  | <0.22  | <0.22  | <0.22  | <0.22  | <0.22  | N/A    |
| 1,4-Dichlorobenzene         | <0.26  | <0.26  | <0.26  | <0.26  | <0.26  | <0.26  | <0.26  | 115    |
| 2,2-Dichloropropane         | <0.11  | <0.11  | <0.11  | <0.11  | <0.11  | <0.11  | <0.11  | N/A    |
| 2-Butanone (MEK)            | <2.4   | <2.4   | <2.4   | <2.4   | <2.4   | <2.4   | <2.4   | 22,000 |
| 2-Chlorotoluene             | <0.24  | <0.24  | <0.24  | <0.24  | <0.24  | <0.24  | <0.24  | N/A    |
| 2-Hexanone                  | <1.5   | <1.5   | <1.5   | <1.5   | <1.5   | <1.5   | <1.5   | 99     |
| 4-Chlorotoluene             | <0.25  | <0.25  | <0.25  | <0.25  | <0.25  | <0.25  | <0.25  | N/A    |
| 4-Methyl-2-pentanone (MIBK) | <1.4   | <1.4   | <1.4   | <1.4   | <1.4   | <1.4   | <1.4   | 170    |
| Acetone                     | <4.7   | 10.0   | 9.6    | 11.8   | 6.0    | 6.1    | 7.1    | 1,700  |
| Benzene                     | <0.088 | <0.088 | <0.088 | <0.088 | <0.088 | <0.088 | <0.088 | 160    |
| Bromobenzene                | <0.23  | <0.23  | <0.23  | <0.23  | <0.23  | <0.23  | <0.23  | N/A    |
| Bromo(chloromethane)        | <0.19  | <0.19  | <0.19  | <0.19  | <0.19  | <0.19  | <0.19  | 320    |
| Bromodichloromethane        | <0.12  | <0.12  | <0.12  | <0.12  | <0.12  | <0.12  | <0.12  | 340    |
| Bromoform                   | <0.38  | <0.38  | <0.38  | <0.38  | <0.38  | <0.38  | <0.38  | 230    |
| Bromomethane                | <0.99  | <0.99  | <0.99  | <0.99  | <0.99  | <0.99  | <0.99  | 16     |
| Carbon disulfide            | <0.24  | <0.24  | <0.24  | <0.24  | <0.24  | <0.24  | <0.24  | 15     |
| Carbon tetrachloride        | <0.19  | <0.19  | <0.19  | <0.19  | <0.19  | <0.19  | <0.19  | 77     |
| Chlorobenzene               | <0.23  | <0.23  | <0.23  | <0.23  | <0.23  | <0.23  | <0.23  | 25     |
| Chloroethane                | <0.38  | <0.38  | <0.38  | <0.38  | <0.38  | <0.38  | <0.38  | N/A    |
| Chloroform                  | <0.17  | <0.17  | <0.17  | <0.17  | <0.17  | <0.17  | <0.17  | 140    |
| Chloromethane               | <0.44  | <0.44  | <0.44  | <0.44  | <0.44  | <0.44  | <0.44  | N/A    |
| Dibromochloromethane        | <0.17  | <0.17  | <0.17  | <0.17  | <0.17  | <0.17  | <0.17  | 320    |
| Dibromomethane              | <0.19  | <0.19  | <0.19  | <0.19  | <0.19  | <0.19  | <0.19  | N/A    |
| Dichlorodifluoromethane     | <0.49  | <0.49  | <0.49  | <0.49  | <0.49  | <0.49  | <0.49  | N/A    |
| Ethylbenzene                | <0.18  | <0.18  | <0.18  | <0.18  | <0.18  | <0.18  | <0.18  | 61     |
| Hexachloro-1,3-butadiene    | <0.51  | <0.51  | <0.51  | <0.51  | <0.51  | <0.51  | <0.51  | N/A    |
| Isopropylbenzene (Cumene)   | <0.19  | <0.19  | <0.19  | <0.19  | <0.19  | <0.19  | <0.19  | 4.8    |
| Methyl-tert-butyl ether     | <0.093 | <0.093 | <0.093 | <0.093 | <0.093 | <0.093 | <0.093 | N/A    |
| Methylene Chloride          | <0.81  | <0.81  | <0.81  | <0.81  | <0.81  | <0.81  | <0.81  | 1,500  |
| Naphthalene                 | <0.56  | <0.56  | <0.56  | <0.56  | <0.56  | <0.56  | <0.56  | 21     |
| Styrene                     | <0.17  | <0.17  | <0.17  | <0.17  | <0.17  | <0.17  | <0.17  | 32     |
| Tetrachloroethene           | <0.15  | <0.15  | <0.15  | <0.15  | <0.15  | <0.15  | <0.15  | 53     |
| Toluene                     | <0.18  | <0.18  | <0.18  | <0.18  | <0.18  | <0.18  | <0.18  | 62     |
| Trichloroethene             | <0.25  | <0.25  | <0.25  | 0.57   | <0.25  | 0.39   | 0.29   | 220    |
| Trichlorofluoromethane      | <0.24  | <0.24  | <0.24  | <0.24  | <0.24  | <0.24  | <0.24  | N/A    |
| Vinyl chloride              | <0.25  | <0.25  | <0.25  | 1.4    | 1.6    | 0.77   | 0.51   | 930    |
| Xylene (Total)              | <0.54  | <0.54  | <0.54  | <0.54  | <0.54  | <0.54  | <0.54  | 27     |
| cis-1,2-Dichloroethene      | 0.63   | <0.15  | 0.25   | 13.1   | 7.2    | 7.5    | 5.8    | 620    |

|                           |       |       |       |       |       |       |       |     |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-----|
| cis-1,3-Dichloropropene   | <0.13 | <0.13 | <0.13 | <0.13 | <0.13 | <0.13 | <0.13 | N/A |
| n-Butylbenzene            | <0.26 | <0.26 | <0.26 | <0.26 | <0.26 | <0.26 | <0.26 | N/A |
| n-Propylbenzene           | <0.16 | <0.16 | <0.16 | <0.16 | <0.16 | <0.16 | <0.16 | N/A |
| p-Isopropyltoluene        | <0.23 | <0.23 | <0.23 | <0.23 | <0.23 | <0.23 | <0.23 | N/A |
| sec-Butylbenzene          | <0.22 | <0.22 | <0.22 | <0.22 | <0.22 | <0.22 | <0.22 | N/A |
| tert-Butylbenzene         | <0.18 | <0.18 | <0.18 | <0.18 | <0.18 | <0.18 | <0.18 | N/A |
| trans-1,2-Dichloroethene  | <0.15 | <0.15 | <0.15 | 0.16  | <0.15 | <0.15 | <0.15 | 558 |
| trans-1,3-Dichloropropene | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | <0.17 | 1.7 |

\*Two ESVs are available for Total PCBs, including a wildlife ESV of 0.00012 µg/L and an aquatic ESV of 0.014 µg/L. Concentrations highlighted in yellow exceed the ESV.

## Specific Comments

1. **Section 4.5. Page 47.** Please note that the detection limits for PCBs in surface water are above the Region 4 Ecological Screening Values.
2. **Section 5.0. Page 54.** We agree that additional investigation of the tributary in the vicinity of Sed-104 (particularly in the downstream direction) may be necessary to delineate extents of TCE and *cis*-1,2-DCE contamination.

## Hydrogeologist Comments

1. **Section 4.1, Vapor Intrusion Sample Results, Page 31.** Recommend finishing the four seasonal rounds of sub-slab and indoor air samples at the residences with detections of chlorinated compounds. Those with no detections in the previous rounds can be considered for elimination. Concur that the acetone detections appear to be spurious laboratory contaminants.

**Section 4.1, Vapor Intrusion Sample Results, Page 31.** Concur that the higher indoor air sample results at 503 West McKissock relative to collocated sub-slab results are indicative of a contributing indoor air source outside of a completed vapor intrusion pathway. Recommend completing the seasonal sampling events before making a final response decision.

2. **Table 10.** The results from sample 8524-25 north of the creek may be indicative of another source area from dumping in the creek or possibly resulting from groundwater contamination and/or base flow migration from the southern portion of the Martha Rose Site.
3. **Figure 9.** The increase in TCE concentrations at TW-27 could potentially be attributable to another source such as “midnight dumping” along the wastewater treatment access road in the creek. This could also be at least potentially attributable to groundwater migration in the creek alluvium and from baseflow of contaminated surface water reentering the creek alluvium. The spatial distance between TW-27 and TW-43 is significant (over 1,000 feet) with no sampling data in between.
4. **Figures 10 and 11.** The TCE and TCE degradation product detections in surface water and sediment from SW-104 (Figure 10) and SED-104 (Figure 11) are indicative of groundwater to surface water migration via base flow to the creek given the shallow depth of bedrock, the shallow depth of the water table and the depth of the intersecting creek channel. This is adjacent to the areas of the former Martha Rose Site with the highest historical TCE detections in shallow groundwater.

5. **Figure 12.** Recommend dashing the isoconcentration contours of TCE between TW-27 and TW-43 given the large spatial distance between these two points.
6. **Figure 12.** The “Y” shaped feature in TCE isoconcentrations in the southwestern corner of the former Martha Rose Site in this figure is indicative of a drainage divide feature in the shallow bedrock, and may also indicate that the creek alluvium is a preferred shallow groundwater migration pathway incised into the shallow shale bedrock.
7. **General Comment/Recommendations.** If the seasonal rounds of VI indoor air and sub-slab sampling do not verify a completed VI pathway for TCE and associated chlorinated hydrocarbons above RMLs, no significant conditions to warrant a removal action consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) appear to be present. There are no known domestic wells at the Site. However, an observed release of hazardous substances to groundwater, surface water, and sediment has been documented warranting additional remedial site assessment to further evaluate the surface water and groundwater pathways consistent with the NCP, including an updated Hazard Ranking System target evaluation (especially considering the age of most of the Martha Rose Site information).

## **References**

USEPA. 2018. Region 4 Ecological Risk Assessment Supplemental Guidance. Scientific Support Section. Superfund Division. USEPA Region 4. Atlanta, GA.

CONCURRENCE: Name/Ext/Date/File Location

| DIV/BR   | LSASD/ASB | LSASD/ASB | LSASD/ASB |  |
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| NAME     |           |           |           |  |
| DATE     |           |           |           |  |
| INITIALS |           |           |           |  |